Unpolluted lake: Preserve Environment and Elevate Fishery

Urban lakes are important to enhance aquatic population and also for aesthetic values. Further, the lakes acts as a charger of the ground water as well. Lakes are critically important for the people for food security and livelihood. To get good environment and aquatic products lake water needs to be kept pollution free and clean.

The developing economy of Bangladesh is now investing more in infrastructure and in industry creating unplanned urbanization. Dhaka the capital city of Bangladesh is one of the oldest cities in the region, now burdened with one of the most densely populated metropolitan city of the world. This has created problems like illegal land grabbing and pollution of the city lakes. The present research financed by PIU-BARC under NATP is implemented by the Dhaka University for a period of three years. This study is primarily dedicated to assess the level of pollution and the diversity of aquatic animal life in the urban lakes namely Gulshan and Dhanmondi. Further, the study aims at formulating a plan to restore the quality and diversity values of these natural lakes.

Current lake status

- There are several open sewage outlets in Gulshan lake whereas these type of sources are blocked in Dhanmondi lake.
- Physically there are more tendencies to grab land in Gulshan lake area than Dhanmondi.

Land grabbing at Gulshan lake

Dying of Fish in Gulshan lake

- Water quality and bottom soil condition are bad in Gulshan lake.
- Dhanmondi lake water quality is maintained local community by blocking pollution sources. Ecologically the presence of freshwater mussels (*Lamellidens marginalis* and others.) continuous filtering of water by Dhanmondi lake keeps the water cleans.

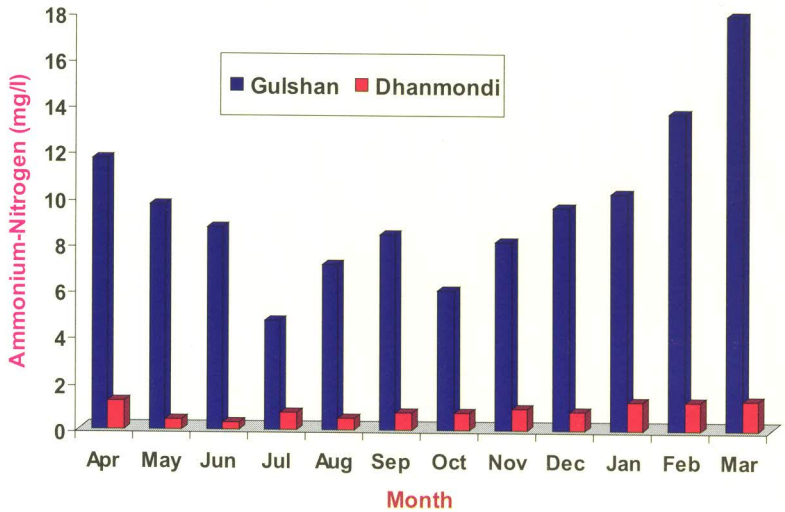
Soil of Gulshan lake

Study Methodology

- Physical assessments were made in lakes Periphery. Physcio-chemical parameters of water were analysed in situ and in laboratory.
- Heavy metals of water and soil (Zinc, Chromium, Cadmium, Lead, Copper, Nickel and Manganese) anlaysed during winter, pre monsoon and monsoon.
- Qualitative and quantitative estimation of plankton and benthic fauna of two lakes were analysed.

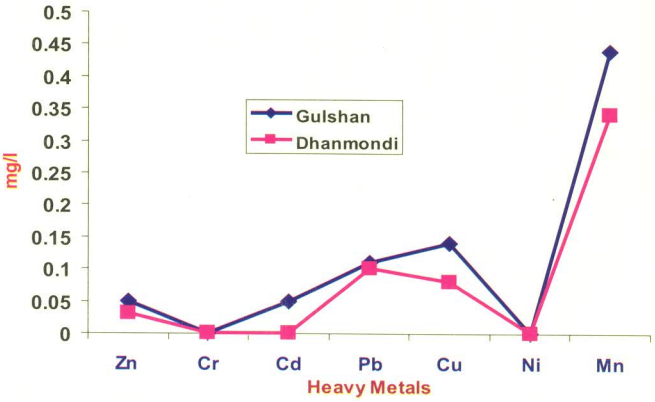
Research Highlights

- Ammonium-Nitrogen, Alkalinity, Hardness, Conductivity, and Total dissolved solids (TDS), Biochemical oxygen demand (BOD) and Chemical oxygen demand (COD) were found in higher concentrations in Gulshan lake than Dhanmondi lake. Dissolved Oxygen (DO) showed lower values in Gulshan lake than Dhanmondi lake. Which indicates higher pollution in Gulshan lake water and not suitable for fish culture.

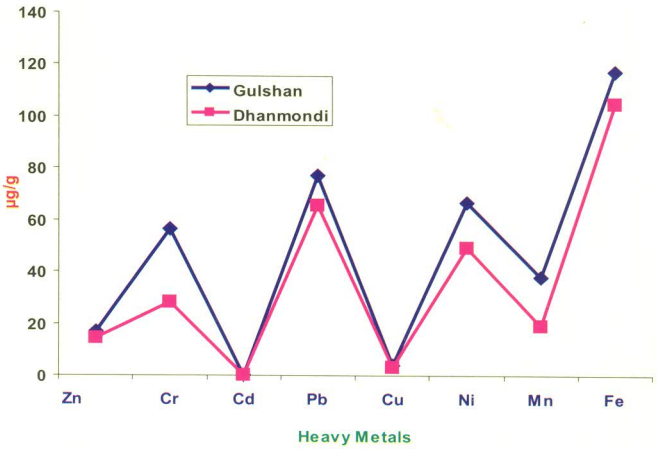


Ammonium-Nitrogen of lake water of Dhaka city

- Heavy metals in water (Zinc, Chromium, Cadmium, Lead, Copper, Nickel and Manganese) were found in higher concentration in Gulshan lake than Dhanmondi lake. Aquatic products like fish from Gulshan Lake may not be of acceptable for consumption.
- Soils of Gulshan lake contains higher heavy metals (Zinc, Chromium, Cadmium, Lead, Copper, Nickel and Manganese) than Dhanmondi lake in all seasons. Vegetable produced by using may be not suitable for consumption.
- Plankton population was very higher in Gulshan lake than Dhanmondi lake. This indicates that there is nutrient coming in the lakes and the plankton produced in the lake water not consumed ecologically. That is the sewage pollution led water adding more nutrients to the lake and produces more plankton. The absence of filter feeder animals in the lake resulted in the excess plankton in the Gulshan lakes. The situation is opposite in Dhanmondi lake.



Heavy metals of lake water of Dhaka city



Heavy metals of lake soil of Dhaka city

- Average benthic organisms (Snails, bivalves etc) were found higher in Dhanmondi lake. No benthic mollusk was found in Gulshan lake.
- Preliminary study at Gulshan lake by introducing filter feeding benthic organism shows improvement in the water quality.

Gulshan lake water has been found to be highly polluted round the year. Dhanmondi lake water was found to be less polluted and clean, thereby providing better aquatic environment and aesthetic values.

Bio filtration: natural process to control lake pollution

Bio filtration is the practice of using living animals to biologically capture plankton and clean water to prevent degraded process of a lake. In Dhanmondi lake thousands of bivalve mollusks are offering an unique ecological services. They filter the total lake water column by at least once a day to keep the lake water at an optimum plankton state. Our study shows, this ecological cleaner can be widely introduced in Gulshan lake to get the current high plankton led water clean.

Sport fishing a recreation at Dhanmondi lake

Bivalve mollusks of Dhanmondi lake

Lessons learned

The Ecological balance is an improtant factor for a lake ecosystem. Gulshan lake is more polluted than the Dhanmondi lake. External polluting factors along with missing of benthic bivalve in Gulshan lake resulted in excess concentration of plankton. The water quality of Gulshan lake can be improved by sealing the pollution sources towards lake as by introducing filter feeder fishes (Silver carps, Rui, Catla etc) and bivalves in the lake. Lake fish production could be enhanced leading to income with additional sports fishing and higher aesthetic values.

This is a joint outcome of the PIU-BARC NATP: Phase - 1 and Department of Zoology, Dhaka University, sub-project entitled 'Assessment of Aquatic Pollution and Biodiversity of Some Lakes of Dhaka City'

For further information please contact to
Professor Dr. M. Niamul Naser
Department of Zoology, University of Dhaka
Dhaka, Bangladesh
Phone: +8802 9661920-50/7598
Cell: +8801711 707 217
Fax: 8802 861 5583
Email: mnnaser@du.ac.bd

Pollution sources of Gulshan lake